

REMARKS

Applicants' wish to thank the Examiner for the opportunity to attend an in-person interview on December 2, 2003 to discuss the claim rejections of the Office action mailed July 16, 2003.

In that Office Action, the Examiner: (i) rejected claims 59 to 63, 66, 67, 72 to 88, 90, 91, 94, and 95 under 35 U.S.C. §103(a) as being unpatentable over Miyanaga et al. (U.S. Pat. 5,397,558) or Fuesser et al. (U.S. Pat. 5,628,920), both in view of Shen et al., (ii) rejected claims 68 to 71 under 35 U.S.C. §103(a) as being unpatentable over Miyanaga et al. or Fuesser et al. both in view of Kulisch (U.S. Pat. 5,246,198) and Shen et al. (*J. Am. Chem. Soc.* **1992**, 114, 497-505), and (iii) rejected claims 92 and 93 under 35 U.S.C. §103(a) as being unpatentable over Miyanaga et al. or Fuesser et al. both in view of Gruen (B 2.3).

In this response, only claim 81 has been amended, which amendment is made to correct a spelling error and thereby make the claims more consistent with the independent claim 61 from which it depends. Thus, claims 59 to 63, 66 to 88, and 90 to 95 are pending.

Turning now to the rejections of record, and the Applicants' response thereto:

Section 103(a) Rejections

Claims 59 to 63, 66, 67, 72 to 88, 90, 91, 94, and 95

The Examiner has rejected claims 59 to 63, 66, 67, 72 to 88, 90, 91, 94, and 95 under 35 U.S.C. §103(a) as being unpatentable over Miyanaga et al. or Fuesser et al., both in view of Shen et al. For the following reasons, and as discussed at the interview, favorable reconsideration of the rejections is most respectfully requested.

Miyanaga et al. discloses a CVD method for forming a diamond film using a reactive gas that includes substituted and unsubstituted adamantanes, diamantanes, and triamantanes. See col. 3, lines 15-57, and in particular, Figs. 5A-E. Fuesser et al.

discloses a method of forming a diamond and/or diamond-like cover layer wherein adamantane and/or congressane (diamantane) are used as growth nuclei for the diamond or diamond-like cover layer. See col. 3, lines 28-32.

The Shen et al. reference used theoretical methods such as molecular mechanics to report the extent to which the theoretical carbon-carbon bond lengths, bond angles, and heats of formation of seven molecular clusters, including isotetramantane, cyclohexamantane, and the "adamantane of adamantanes" (decamantane), compare to the values in the bulk diamond lattice.

The significance of such calculations is ambiguous, especially with regard to the ability of a higher diamondoid to nucleate a diamond film. For example, the Shen et al. reference states that:

"All theoretical methods used here predict at least somewhat longer lengths for these bare CC bonds than in the CC distance in the diamond lattice... [and that] clearly, crystal structures for the larger polymantane molecules would be of great value in clarifying this point." See page 504, first column.

The Shen et al. reference concludes by stating that, again with no comments relating to the ability of such compounds to nucleate a diamond film:

"With this research, theory is now well ahead of experiment with respect to understanding the approach to the diamond limit of hydrocarbon molecular structures. At this point it would be extremely valuable to have crystal structures and thermodynamic information for several of the important molecules studied here. To date there is no such experimental characterization for triamantane, isotetramantane, cyclohexamantane, and the adamantane-of-adamantanes. The theoretical methods employed here produce a rather wide range of predictions." See page 505, second column.

The Shen et al. reference is therefore theoretical in nature, and is ambiguous and uncertain with regard to the characteristics of higher diamondoid compounds. In view of this, and as discussed at the interview, it is the Applicants' position that one of ordinary skill in the art would not be able to predict with reasonable certainty that higher diamondoids will nucleate a diamond film.

Favorable reconsideration and withdrawal of the Examiner's rejections of claims 59 to 63, 66, 67, 72 to 88, 90, 91, 94, and 95 over Miyanaga et al. or Fuesser et al., taken in view of Shen et al., are therefore respectfully requested.

Claims 68 to 71

Claims 68 to 71 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Miyanaga et al. or Fuesser et al., both in view of Kulisch (U.S. Pat. 5,246,198), and Shen et al. It is Applicants' view that Miyanaga et al. or Fuesser et al., even in view of Kulisch, and Shen et al., do not allow one of ordinary skill in the art to predict with reasonable certainty that higher diamondoids will nucleate a diamond film. Since claim 61 is believed to be patentable for the reasons discussed above, and claims 68 to 71 depend from claim 61, claims 68 to to 71 are believed to be patentable as well.

Favorable reconsideration and withdrawal of the Examiner's rejections of claims 68 to 71 over Miyanaga et al. or Fuesser et al., both in view of Kulisch and Shen et al., are therefore respectfully requested.

Claims 92 and 93

Claims 92 and 93 are rejected under 35 U.S.C. §103(a) as being unpatentable over Miyanaga et al. or Fuesser et al., both in view of Gruen (B 2.3). It is Applicants' view that Miyanaga et al. or Fuesser et al., even in view of Gruen, do not allow one of ordinary skill in the art to predict with reasonable certainty that higher diamondoids will nucleate a diamond film. Since claim 90 is believed to be patentable for the reasons discussed above, and since claims 92 and 93 depend from claims 90 and 92, respectively, claims 92 and 93 are believed to be patentable as well.

Favorable reconsideration and withdrawal of the Examiner's rejections of claims 92 and 93 over Miyanaga et al. or Fuesser et al., both in view of Gruen, are therefore respectfully requested.

CONCLUSIONS

The theoretical methods of the Shen et al. reference produce a rather wide range of predictions, and due to the uncertainty and ambiguity of the Shen et al. reference, one of ordinary skill in the art would not be able to predict with reasonable certainty that higher diamondoids will nucleate a diamond film.

Thus, claims 59 to 63, 66 to 88, and 90 to 95 are believed to be in condition for allowance. Favorable reconsideration and withdrawal of the Examiner's Section 103(a) rejections of claims 59 to 63, 66 to 88, and 90 to 95 over Miyanaga et al., Fuesser et al., Shen et al., Kulisch, and Gruen are therefore respectfully requested.

Respectfully submitted,
BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By: Stephen F. Powell

Stephen F. Powell
Registration No. 43,014
Redwood Shores, California Office
(650) 622-2300

P.O. Box 1404
Alexandria, Virginia 22313-1404

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